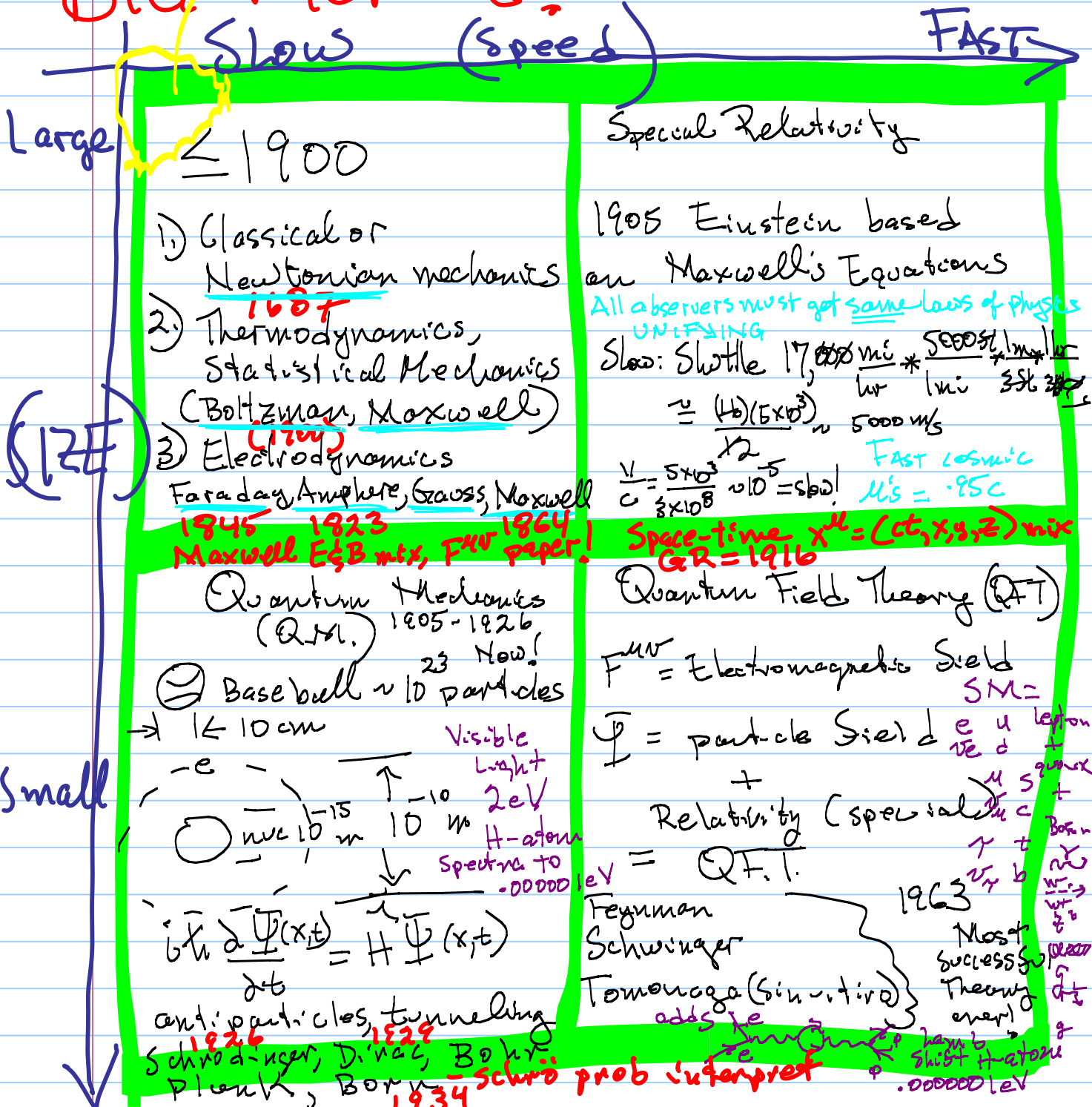


BIG PICTURE!

\rightarrow General Relativity!



- 1900
- 1) Classical or Newtonian mechanics
 - 2) Thermodynamics, Statistical Mechanics (Boltzmann, Maxwell)
 - 3) Electrodynamics (Faraday, Ampere, Gauss, Maxwell)

Special Relativity

1905 Einstein based on Maxwell's Equations

All observers must get same laws of physics

UNIFYING

Slow: Shuttle $17,000 \frac{\text{mi}}{\text{hr}} * \frac{5000 \text{ ft}}{1 \text{ mi}} * \frac{1 \text{ hr}}{3600 \text{ s}} = \frac{(46)(5 \times 10^3)}{3600} \approx 5000 \text{ m/s}$

Fast cosmic $c = 3 \times 10^8 \text{ m/s} = 3 \times 10^8 * 10^{-5} = 3 \times 10^3 \text{ m/s} = 3000 \text{ m/s}$

1945 1923 Maxwell E & B mix, P & V paper!

Spec-time $x^\mu = (ct, x, y, z) \text{ m/c}$

GR = 1916

Quantum Mechanics (QM.) 1905-1926

Baseball $\sim 10^{23}$ particles

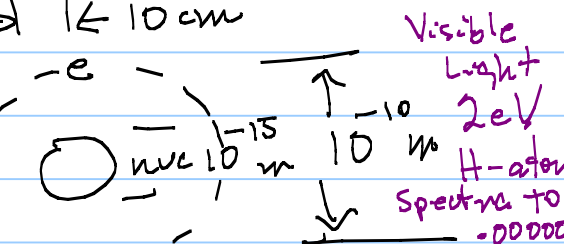
\rightarrow radius $\sim 10 \text{ cm}$

Quantum Field Theory (QFT)

$F^{\mu\nu}$ = Electromagnetic Field

Ψ = particle field

+ Relativity (special)



$\Psi = \text{particle field}$

+ Relativity (special)

$\Psi = \text{Q.F.T.}$

$i\hbar \frac{\partial}{\partial t} \Psi(x,t) = H \Psi(x,t)$

anti-particles, tunneling

1926 Schrödinger, Dirac, Bohr

1934 Planck, Bohr, Schrödinger

Feynman

Schwinger

Tomonaga (Sin-itiro)

1963 Most successful Theory ever!

prob interpret